

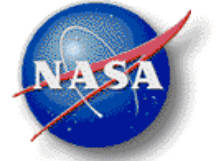


## NASA C-17 Usage Overview



# 2007 Activities

## Integrated Vehicle Health Management



### NASA Propulsion Health Management Flight Objectives:

- ***Damaged Aircraft / Good Engines (DamAGE) Project Compressor Mapping:*** NASA recorded compressor flow, temperatures, and pressures at the inlet and exhaust of the High Pressure Compressor (HPC) section in order to calibrate a Pratt and Whitney engine model for NASA Glenn Research Center
- ***\* IVHM Data Fusion:*** Flight data collected from existing sensors, advanced PHM sensors, and ARINC 429 available signals are being utilized to develop models, analysis methods, and information fusion algorithms, and to develop real-time data publishing and data mining capabilities
- ***\* Commercial Modular Aero-Propulsion System Simulation (CMAPSS):*** Demonstrated that the CMAPSS engine model can successfully execute in real time onboard the C-17 T-1 aircraft using engine and aircraft flight data as inputs.
- \* ***This research has continued into FY08 through ride along flight opportunities***



# Future Work



- **Aging Aircraft & Durability Research:**
  - Joint project with Boeing Commercial and NASA Ames Research Center
  - Wire fault detection on-board the C-17 with Time Pulse Reflectometry (TDR) device.
  - Uses existing operational wire bundles
  - Ground test initially, then flight test.
- **Airframe Health Management Research:**
  - NASA SBIR Phase II with AeroTech Corp.
  - Quantitative Condition Alerting & Analysis Support (QCAAS)
  - Requires installation of accelerometer package in cabin of C-17 near tail
- **Propulsion Health Management Research - Gas Path:**
  - Flight Test of High Temperature Sensor in 500° C environment. Requires installation of an analog amplifier circuit.
  - Capitalizes on recent developments of Silicone Carbide sensors at NASA Glenn Research Center.
- **Propulsion Health Management Research - Engine Vibration:**
  - Generic Integrated Engine Health Management / Controller System
  - AFRL SBIR Phase II with Intelligent Automation Corporation
  - Ground test initially, then flight test.

All flight testing will be through ride-along opportunities.